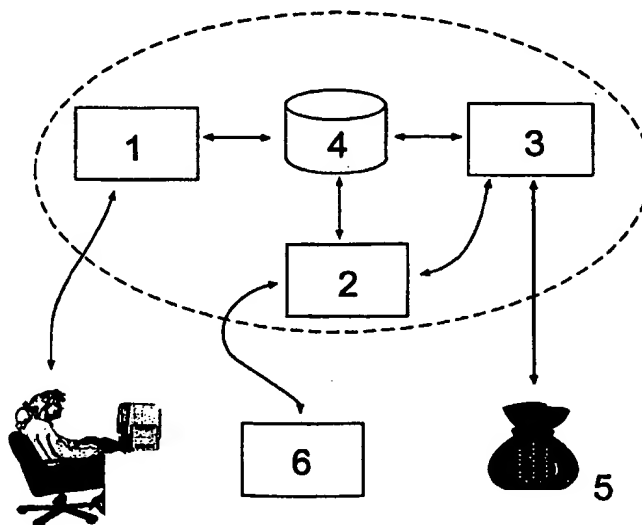


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## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/SE98/02192 <b>(22) International Filing Date:</b> 1 December 1998 (01.12.98)  <b>(30) Priority Data:</b> 9704496-0      3 December 1997 (03.12.97)      SE  <b>(71) Applicant:</b> TELIA AB (publ) [SE/SE]; Mårbackagatan 11, S-123 86 Farsta (SE).  <b>(72) Inventor:</b> NORDSTRÖM, Nils-Åke; Lysekilsvägen 38, S-857 33 Sundsvall (SE).  <b>(74) Agent:</b> PRAGSTEN, Rolf; Telia Research AB, Vitsandsgatan 9, S-123 86 Farsta (SE).		<b>(81) Designated States:</b> EE, LT, LV, NO, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).  <b>Published</b> <i>Without international search report and to be republished upon receipt of that report.</i>

**(54) Title:** SYSTEM FOR INFORMATION RELATED TO CHARGING/DEBITING RELATED TO TELECOMMUNICATION SERVICES**(57) Abstract**

The invention consists of a system for charging and handling, and reporting on information related to charging, related to telecommunication in a packet switched network. The invention is based on three basic functions; Customer Support (3), Information related to Charging (2), and Charging (3), and a common database; Customer Database (4). At utilization of telecommunications, both utilization of telecommunication network and telecommunication service shall be charged. These two utilizations shall be distinguished and be charged independent of each other, by charging a subscriber account.

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TITLE OF THE INVENTION: SYSTEM FOR INFORMATION RELATED TO  
CHARGING/DEBITING RELATED TO  
TELECOMMUNICATION SERVICES

5 TECHNICAL FIELD

The invention relates to a generic system for charging/debiting as well as handling and reporting on information related to charging related to telecommunication in a packet switched network, primarily a  
10 broadband IP-network. By the invention, automatization of charging and paying for the utilization of the telecommunications is made possible. The invention is based on three basic functions: Customer Support, Information related to charging, and Charging, as well as a common  
15 database: Customer Database.

PRIOR ART

A great number of systems have been designed for charging of utilization of telecommunications. I.a. there are  
20 systems to charge in advance bought smart cards at telephone utilization or other systems to charge in advance paid means.

TECHNICAL PROBLEM

25 With today's handling of charging of telecommunication services, and information related to charging to customer, each service is handled separately. In an environment where a great number of different telecommunication services are offered, and each customer utilizes several services, such  
30 a handling will be unwieldy to a supplier with a large service offering to a large number of customers of different categories. By the service offering increasing all the time, also the handling problems will increase, with rising costs for the supplier at introduction of a new  
35 service and greater difficulties to distribute information about new services to customer.

With the charging systems which are utilized today, network and service utilization are not separated, which is important for the charging being experienced as fair both to customer and supplier.

#### TECHNICAL SOLUTION

The technical solution is characterized in a uniting database with customer and information related to charging. Processing and possibility to access information is achieved in the two functions Information related to charging (2), and Charging (3). Collection of data for charging, and transmission for handling of information related to charging is made by the MIB in the subscriber's modem.

In addition to that, there is a function for initiation, Customer Support (1).

The technical solution as to the rest appears from the patent claims.

#### ADVANTAGES

The invention comprises a system which handles charging and information related to charging, and information to customer. The system is independent of type of service and charges utilization of both network and service. By the design of the system, notification via post is not necessary.

30

By using a generic system for handling and reporting on information related to charging, the introduction of new services and functions are facilitated. By that the costs are reduced at the same time as the system provides possibility to arrange tailor-made charging functions for different user categories (for instance a certain company)

and to, when necessary, change tariffs or other data for charging. The customer also will have a quick and good service by the possibility to ask the database for information related to charging and to check the own  
5 charging account.

The system does not need a network of its own, but can be operated on existing IP-based telecommunication networks via the SNMP-protocol and different security functions. By  
10 that no investments are needed in new or extended support systems.

#### DESCRIPTION OF DRAWINGS

Figure 1 shows the construction of a system for handling  
15 and reporting on information related to charging related to telecommunication services. In the figure also are shown which main functions that exist in the system.

#### DETAILED DESCRIPTION

20

##### Abbreviations

MIB            Management Information Base. Part of the SNMP-  
standard for definition of functionality of  
25 monitored object.

QoS            Quality of Service. Parameters which define  
wanted performance for, for instance, a  
transmission service within ATM.

30

#### PRINCIPLE OF CHARGING

At utilization of telecommunications, both utilization of telecommunication networks och telecommunication service  
35 shall be charged. Both these utilizations shall be distinguished and charged independent of each other.

Charging of utilization of telecommunication networks shall be based on a measure of the volume that is utilized. The volume during a session can, in a packet switching network, be calculated as the product of the number of packets and  
5 an average of the length of packets.

Charging principle for utilization of telecommunication service is determined individually per service. Each service has a charging principle of its own, which is  
10 entirely determined by the utilization of the service and is not affected by the utilization of the network. The charging can, for instance, be based on used time, downloaded amount of information, or QoS.

15 Charging can be made by an account, connected to the subscriber, being charged. The charging system charges the account for all utilization of telecommunication networks or telecommunication services. This means i.a. that utilization of a number of different services can charge  
20 the same subscriber account.

#### SYSTEM CONSTRUCTION

##### General

25 The system is constructed of a number of basic functions as well as utilization of existing functions och existing infrastructure.

##### MIB (6)

30 In the MIB in the subscriber's modem, the network utilization is integrated before transmission of information related to network utilization to Charging Info (2). The integration is only made of transmitted messages - received messages are already charged at the  
35 transmission. Transmission to Charging Info is made at a

certain integrated volume (when the MIB is "full"), periodically, or at request of Charging Info.

#### Customer Support (1)

- 5 The principal task for Customer Support is to open a subscription and initiate the charging functions for a subscriber.

#### 10 Charging Info (2)

- The function Charging Info handles and buffers network utilization information from MIB (6) at the subscriber's modem. By this buffering the network utilization information is compressed. It is then forwarded as  
15 information related to charging to Charging/Billing System (3).

#### Charging/Billing System (3)

- The Charging/Billing System handles the subscriber account  
20 of the subscription and charges it according to the information related to charging from Charging Info. The function constitutes "billing system" by settling of the subscriber's accounts in bank (5), and in that way handles the customer's payment of utilization charges.

25

#### Customer Database (4)

- The database contains i.a information about the customer, the customer's data related to charging, subscriber account and other data which are required for charging and  
30 for information to subscriber.

### FUNCTIONS

#### Types of subscriptions

- 35 A subscription can be either of type "Complete Subscription", which includes both network access and

services, or of type "Service Subscription", which only includes services.

A complete subscription includes subscriber equipment, such as broadband modem, network access, a number of services and a charging profile which the subscriber selects himself/herself. The complete subscription is charged for both network access and service access.

It is possible to subscribe only to a plurality of services and charging profiles, which here are called service subscription. Such a subscription utilizes network services from a complete subscription, which for instance can be applicable for different members of a family, who utilize their own services but will have network access by a common, complete subscription. The service subscription is charged only for service access.

#### Authentication

A user has to authenticate himself/herself to get access to a wanted service. This authentication then will be the basis for charging. Charging for a service is regulated by utilized service and charging profile and is controlled by parameters arranged for the subscription, for instance utilized time, point of time, QoS, etc.

Corresponding authentication is made for the connection of the modem to the network. The utilization of network is charged the complete subscription which is concerned.

30

#### Charging of network utilization

In order not to load the charging function Charging Info (2) from collection of data, volume of utilization of telecommunication network is calculated by accumulation of volume information in MIB (6) for concerned subscription. The information then is transferred periodically, at the



request of Charging Info (2), or when the MIB is "full", to the charging function Charging/Billing System (3).

#### Charging of service utilization

- 5 Each service is charged on their own conditions, for instance for IP-telephony, the charging can be controlled by type of call, such as local, national or international and QoS.

#### Subscriber account

- 10 The subscriber can at any time check his/her subscriber account, or change his/her charging profile from own terminal via functions for so called Customer-Query-And-Control. The subscriber by this function can set or change  
15 limit for utilization of a certain service or network access, for instance by setting a max. sum for cost per day/week/month/year.

#### Basic data related to charging to central level

- 20 After the local charging system (2) having arranged basic data for a number of customers, an indication is transmitted to the central charging system (3) for further processing and pricing. These indications can be made periodically, or when a certain amount of information has  
25 been collected.

#### Account management

- The system will periodically perform charging of the subscriber's utilization of services and network access,  
30 and automatically charge the subscriber account. Further, payment can be made by automatic transfer of fixed or variable amount from bank (5). By the transfer being possible to limit, there also is a possibility to determine a max. sum of costs per week/month/year.

Since the transfer is made automatically, and the subscriber has insight into his/her account and account information, the need for notification in connection with payment is limited.

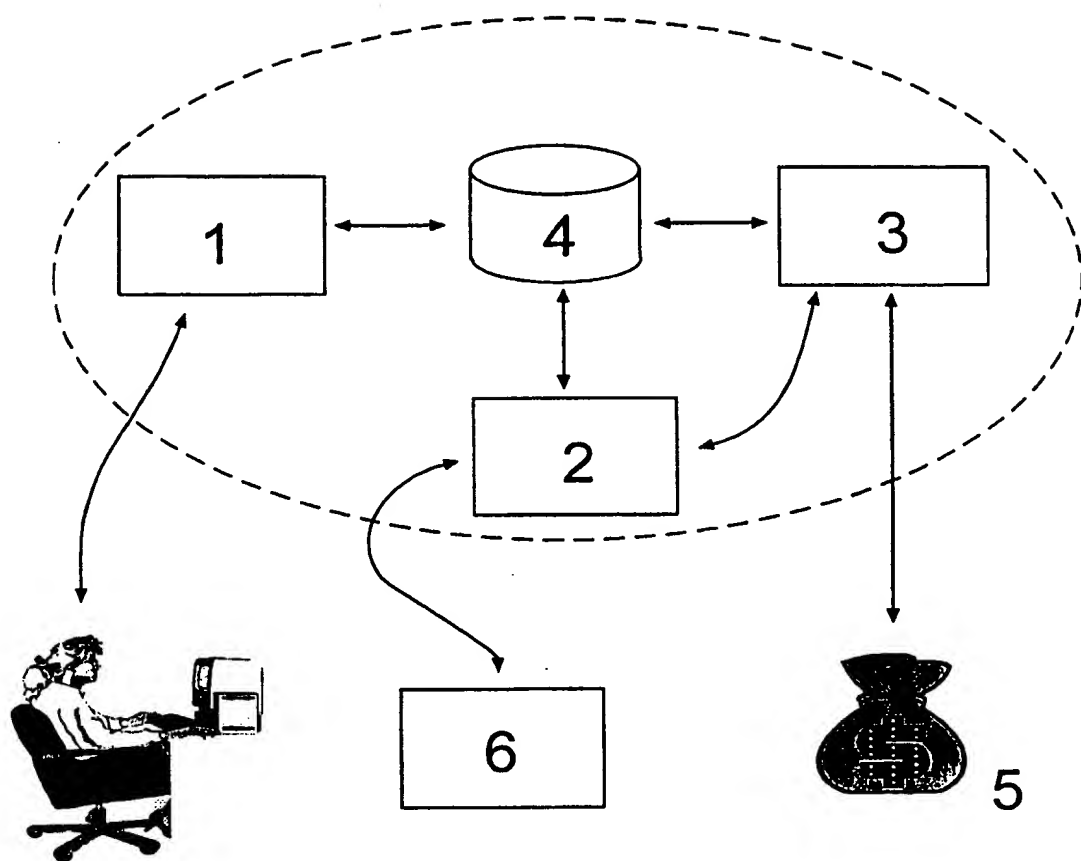
## PATENT CLAIMS

1. System for charging and for handling and reporting on  
information related to charging related to utilization  
5 of telecommunication in packet switched networks,  
c h a r a c t e r i z e d i n
  - that charging is made separately for utilization  
of telecommunication network and of service
  - 10 - that charging of utilization of telecommunication  
network is based on utilized volume
  - that parameters for charging of utilization of  
15 , telecommunication service is determined per service
  - that charging is made by charging subscriber account.
2. System according to patent claim 1,  
20 c h a r a c t e r i z e d i n that a plurality of types  
of subscriptions are handled, for instance complete  
subscription and service subscription.
3. System according to patent claim 1 or 2,  
25 c h a r a c t e r i z e d i n that utilized volume of  
telecommunication network in a packet switched network  
is calculated as the product of number of transferred  
packets and the average length of the packets.
- 30 4. System according to patent claim 3,  
c h a r a c t e r i z e d i n that data about said  
utilized volume is stored in MIB (6) for concerned  
subscription in order to from there be transferred to  
the charging function (2).
- 35 5. System according to any of the patent claims 1 to 4,

c h a r a c t e r i z e d i n

- that subscriber account at telecommunications operator is charged automatically at said utilization of telecommunication network or telecommunication service,
  - that financing of subscriber account is made by transfer from bank account with certain automatic control,
  - that limits in said utilization of telecommunication network or telecommunication service, for instance ceiling for utilization per day, week, month or year, can be controlled individually per customer.
6. System according to any of the patent claims 1 to 5 c h a r a c t e r i z e d i n that the customer via own terminal can:
- check said subscriber account,
  - change charging profile, and
  - change said limits in said utilization.
7. System according to any of the patent claims 1 to 6, c h a r a c t e r i z e d i n a common customer database and the following three basic functions: Customer Support (1), System for Information related to Charging (2), and Charging /Billing (3).

1/1

**Figure 1**